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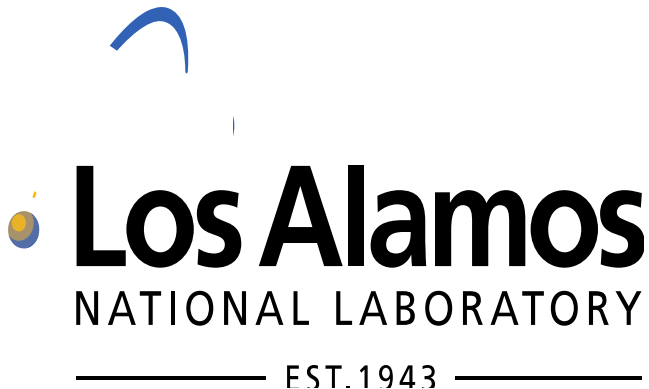
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UC engagement through the Partnerships and Pipeline Office

Nan Sauer
Senior Director
Partnerships and Pipeline Office

September 12, 2019



Managed by Triad National Security, LLC for the U.S. Department of Energy's NNSA

Partnerships and Pipeline Office leads the outreach to Universities and to Industrial partnerships

Pipeline



Partnerships

Pipeline Mechanisms:

- **Student Programs:** Education opportunities for high school, undergraduate, and graduate students
- **Postdoctoral Programs:** Postdocs contribute to research efforts, enhance our STE capabilities

Partnership Opportunities:

- **National Security Education Center Strategic Centers:** Scientific centers of excellence with high international visibility that innovate strategic new science and education programs
- **New Mexico Consortium Coordination:** Creative mechanisms for collaboration with NM research universities through joint appointments and unique facilities
- **Feynman Center for Innovation:** From 'tech transfer' to innovation asset stewardship with strategy driven through Innovation Asset Strategic Council



We engage UC Campuses through several paths

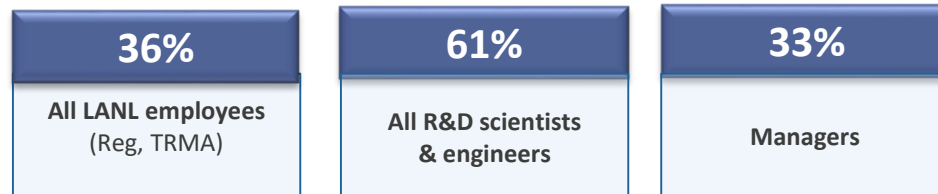
- **Hiring of students and Postdocs from UC campuses**
- **Educational & pipeline**
- **Engineering Institute with UCSD**
 - UC Fee graduate fellowships
- **Collaborative research**
- **Subcontracts to individual universities**
 - LANL funded workshops and visits
 - UC Fee funded Collaborative Research Grants
 - Joint proposals to a range of sponsors
- **Targeted joint initiatives**
 - Entrepreneurial Postdocs (UC Fee funded)
 - Southern Campus Hub
 - Manhattan District Lab Embedded Entrepreneurial Program



LANL students, postdocs: Workforce of the future

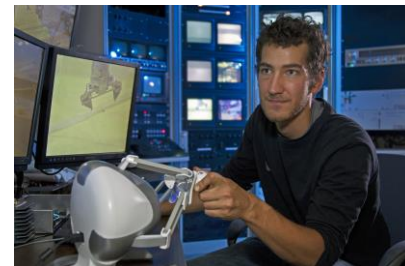
- Our student/postdoc pipeline is crucial for recruiting the workforce of the future and uses our vast university networks.
- The Student and Postdoc Program Offices manage the processes enabling these critical early career pipelines for the institution.
- We partner with line management to create a vibrant, supportive environment for these early-career employees.
- The quality of the individuals, the diversity of the pool, and our investment into their experience and development will impact LANL for generations.

Percentage of total LANL population who are former students or postdocs



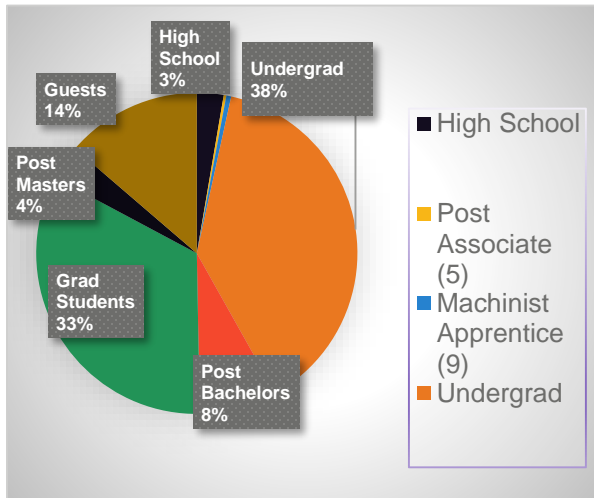
Pipeline initiatives and R&D collaborations are key

- LANL had **1,861 students** at peak in July of 2019
- We have **454 postdocs** as of August 2019
- The Lab supported **16 summer schools** in FY19
 - Applied Machine learning Summer School
 - Nonproliferation Summer Program
 - Quantum Computing School
- 68 Students from UC campuses were LANL interns at LANL this summer
 - 15 students from UCLA
 - 11 Students each at UC Berkeley and San Diego
 - 10 Students UC Santa Barbara
 - 8 Students UC Davis
 - 12 Students total from Irvine, Riverside, Merced & UCSF

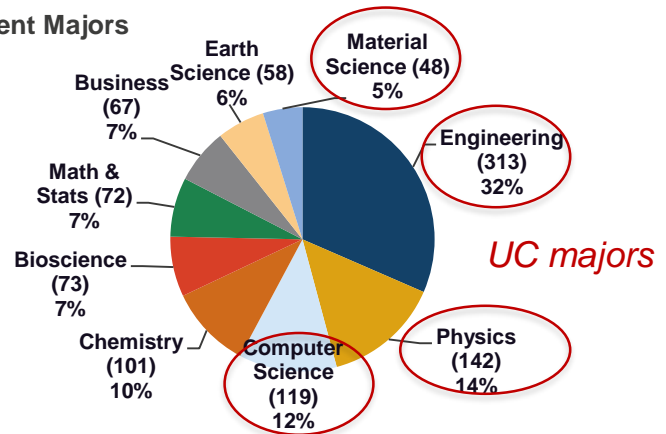


Data for our student pipeline

- Students are used as a pipeline in organizations across the Laboratory.
- The majority of students are in four-year or graduate degree programs.
- There were 210 students in summer school cohorts.



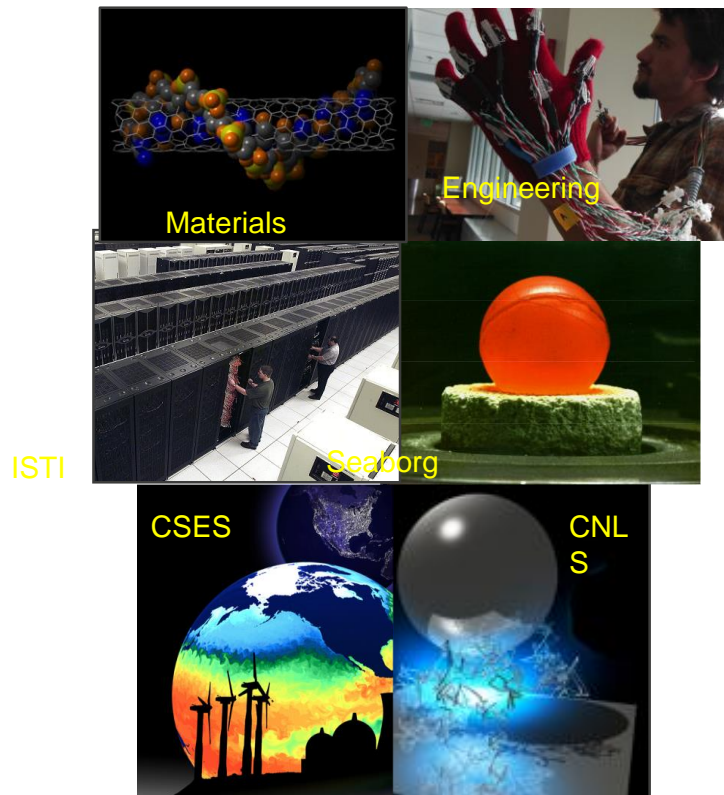
Student Majors



Los Alamos Strategic Centers

Gateways for collaboration, education, and recruitment

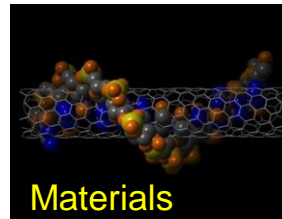
- **Center for Nonlinear Studies**
Interdisciplinary science of complex systems
- **Center for Space and Earth Science**
Astrophysical, space, earth, & climate sciences & their signatures
- **Engineering Institute**
Structural health monitoring, cyberphysical Systems
- **Information Science & Technology**
Education, collaboration, research in IS&T
- **Institute for Materials Science**
Advancement of interdisciplinary materials science
- **Seaborg Institute**
Actinide science & Plutonium Center of Excellence



Los Alamos Strategic Centers

Gateways for collaboration, education, and recruitment

- ***Center for Nonlinear Studies:*** Interdisciplinary science of complex systems
- ***Center for Space and Earth Science:*** Astrophysical, space, earth, & climate sciences & their signatures
- ***Engineering Institute:*** Structural health monitoring, cyberphysical Systems
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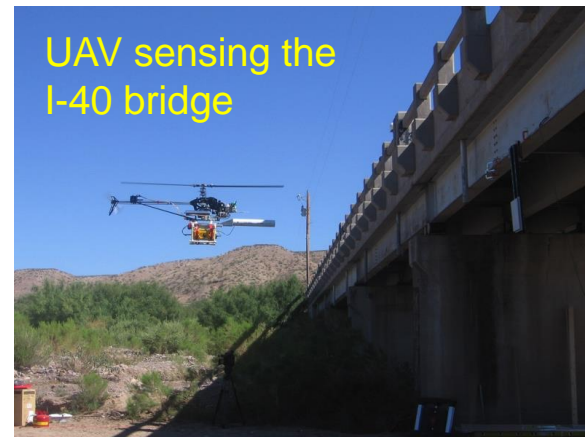
Joint Institutes – The Engineering Institute

- **The Engineering Institute (EI)** is a research and education collaboration between LANL and the University of California San Diego (UCSD) Jacobs School of Engineering.
- **Mission:** Develop a comprehensive and coordinated approach for conducting mission-driven, multidisciplinary engineering research and recruiting, revitalization and retention of the current and future staff necessary to support LANL's diverse technology portfolio.
- **Technical Focus:** multidisciplinary engineering science that integrates advanced **predictive modeling, novel sensing systems and new developments in information technology.**



Mike Todd

Chuck Farrar



Evolving Education Activities with LANL–UCSD EI

- **Graduate degree programs** in place where all work for MS or PhD from UCSD can be done at Los Alamos (**UCSD space in Research Park counts as residency!**)
 - To date >**50** graduate courses from UCSD delivered through distance learning in Los Alamos
 - LANL staff teach courses that are broadcast to UCSD (two are adjunct faculty)
 - EI supports 5-15 UCSD Grad Students/yr + more students supported by NSF & NDSEG fellowships
 - 38 R&D engineers hired into 16 different LANL organizations – 11 to DOE Labs
 - 13 postdocs converted into LANL staff
- **New Mission:** Provide local MS degree (ME, EE) program via distance learning for new hires awaiting their security clearance



Engineering Institute

What metrics we track

- ***Comprehensive Academic and Recruiting Metrics 2003-2018***
- *Additional information:* student pre and post surveys; under-represented group participation; NM or UC student participation; Line Org supplemental funding

Why?

- *LANL & UCSD MUST understand and respect the other organization's metrics for success relevant to the collaboration*
- UCSD most interested in academic and some education metrics
- LANL most interested in recruiting and education program metrics (but also in the academic metrics)

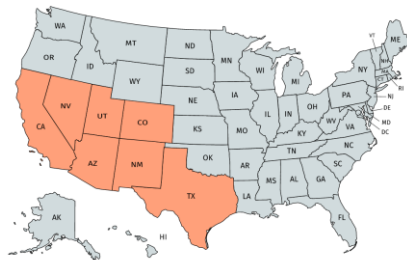
El Highlights

- ***92 students & Postdocs hired at LANL as R&D Engineers and Scientists***
- **337** LA Dynamics Summer School participants
- **61** EI students awarded competitive grad fellowships
- **75** SoS Advanced Study Institute participants
- **27** LANL Staff pursuing UCSD Distance MS Degrees
- **88** UCSD Grad Students under LANL fellowships
- **83** LANL UGS & GRS student interns; **9** HS Coop
- **12** LANL EI Postdocs
- **45** Visiting Students, **3** Visiting Staff
- **65** Awards; includes **3** R&D100
- **115** UCSD Graduate Courses offered at LANL
- **318** Refereed Journal Publications
- **617** Conference Proceedings
- **205** Invited Talks (International and Domestic)
- **27** Technical Reports; **3** Books; **26** Book Chapters
- **47** Short Courses
- **17** Patents and Copyrighted Software Releases
- **2** Congressional Testimony; **9** Journal Editorial Boards

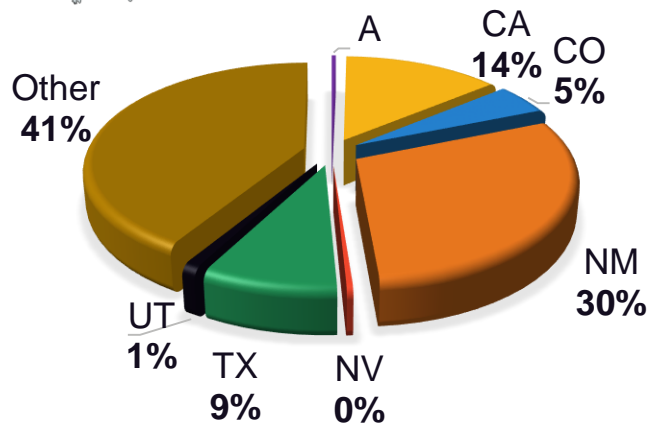
University Subcontracts – Regional Distribution

FY18 Funding Distribution – Regional

Total University Subcontract Funding: \$27,586K



Regional Universities
saw a **\$4,495,612**
increase over
FY17 funding (+38%)



- **\$16,205K** total regional funding
- **38%** increase in total funding
- **Five** regional states saw increases
- Total **161** subcontracts
- **\$100K** average/subcontract
- Increase to **59%** (from 55%) of total subcontract funding

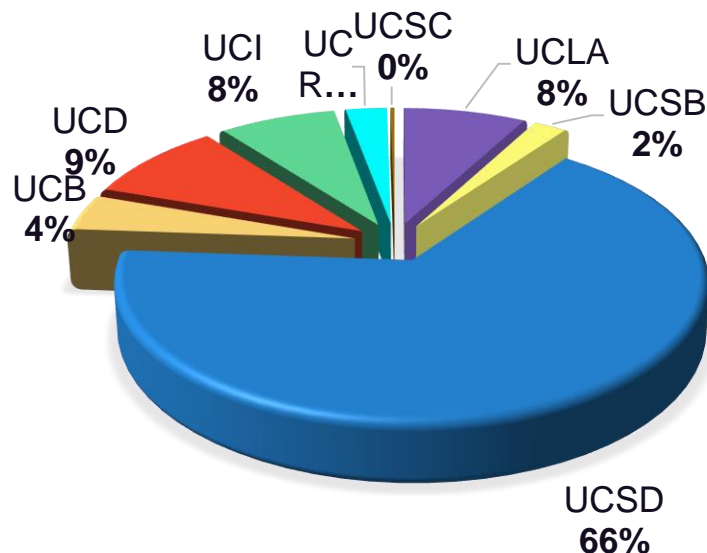
University Subcontracts – University of California

FY18 Funding Distribution by UC Campus

Total University Subcontract Funding: \$27,586K

- **Total UC Funding:** \$3,410K
- **26 subcontracts**
- **\$131K average/subcontract**

86% of UCSD funding is associated with the “LANL/UCSD Engineering Institute”, a research and educational partnership between LANL and the UCSD Jacobs School of Engineering, established in 2003



University of California, Berkeley, UC Davis, UC Irvine, UC Los Angeles, UC Riverside, UC San Diego, UC Santa Barbara, UC Santa Cruz

UC's investments in LANL ST&E are essential

Fee Research Program and VCR Engagement

- Wildfire Research
- Quantum Information Science
- Accelerator S&T

Entrepreneurial Postdoc Program

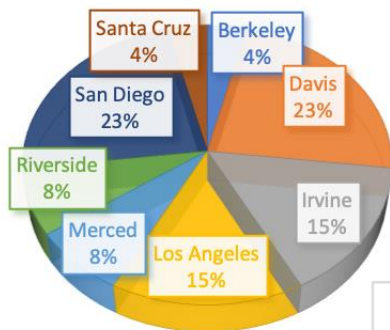
- Cohort #4 being formed

Exploring a “Southern Campus Hub” as a nexus for collaboration

Exploring “Manhattan District,” our analog of Cyclotron Road

LANL Metrics for UC Lab Fee Graduate Fellow Program (2020 awards yet to be selected)

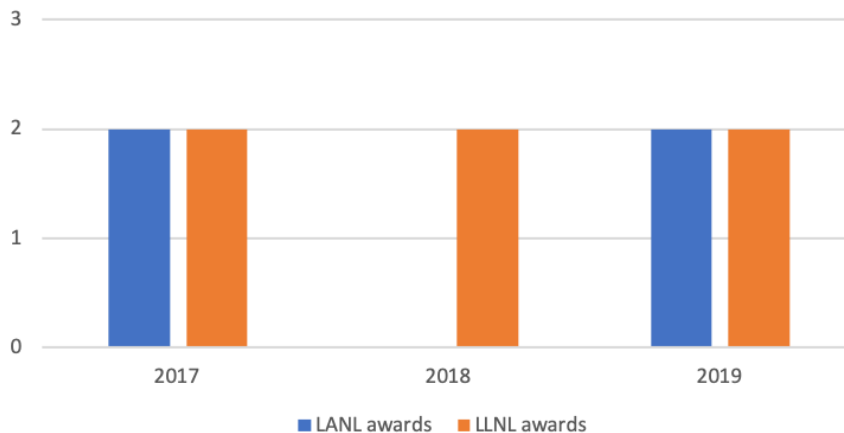
LANL UC GRAD FELLOW PIPELINES
2017-2019



APPLICATIONS
26



UC GRAD FELLOW AWARDS

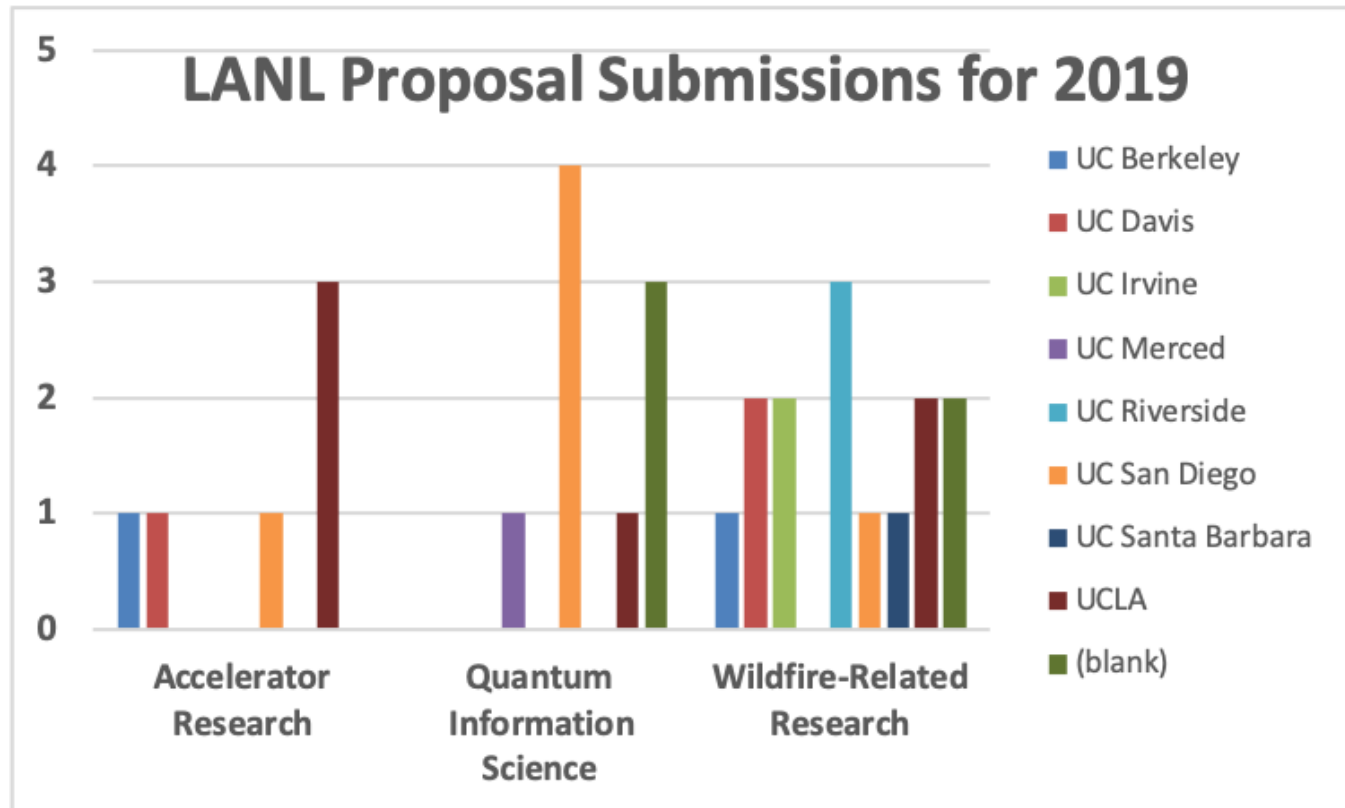


Currently funded Collaborative projects: 11

LANL participation with funding: 8

| | | |
|------|------|--|
| 2017 | LANL | CENTER FOR FRONTIERS IN HIGH ENERGY DENSITY SCIENCE |
| 2017 | LANL | DESIGNER MESOSCALE QUANTUM DOT SOLIDS |
| 2017 | LANL | MACROMOLECULAR MOVEMENTS BY SIMULATION AND DIFFUSE SCATTER |
| 2017 | LANL | MESOSCOPIC 2D MATERIALS: MANY-BODY INTERACTIONS & APPLICATIONS |
| 2018 | | HEADWATERS TO GROUNDWATER: RESOURCES IN A CHANGING CLIMATE |
| 2018 | LANL | SECURING SMART CAMPUSES: A HOLISTIC MULTI-LAYER APPROACH |
| 2018 | LANL | THE FUTURE OF CALIFORNIA DROUGHT, FIRE, AND FOREST DIEBACK |
| 2018 | LANL | CLIMATE IMPACT OF MANURE MANAGEMENT FROM CALIFORNIA DAIRIES |
| 2018 | | UC-LAB CENTER FOR ELECTRICITY DISTRIBUTION CYBERSECURITY |
| 2018 | | GREAT POWER COMPETITION IN THE 21ST CENTURY |
| 2018 | LANL | POLITICAL CONFLICT AND STABILITY IN DYNAMIC NETWORKS |
| 2019 | | TBD (to be announced later in 2019) |

LANL UC Fee CRT Proposals by topic and partner



LANL proposals heavily targeted Wildfire Related Research in 2019

Los Alamos has put a suite of tools in place to enhance the environment for commercialization and entrepreneurship

Builds on foundational programs in the Feynman Center for Innovation



DisrupTech provides coaching activities by industry experts to develop staff & postdocs to identify product needs, understand investor perspectives and improve pitching skills.

Postdoc Entrepreneur Fellowship is a 6-month UC/Los Alamos Fellowship to explore and evaluate a Los Alamos technology for product, customer and market potential using Lean Startup Methods.

Technology Maturation Fund invests in Los Alamos staff to develop targeted results or prototypes that will accelerate the path to commercialization. Just restarted with integrated strategy in FY19

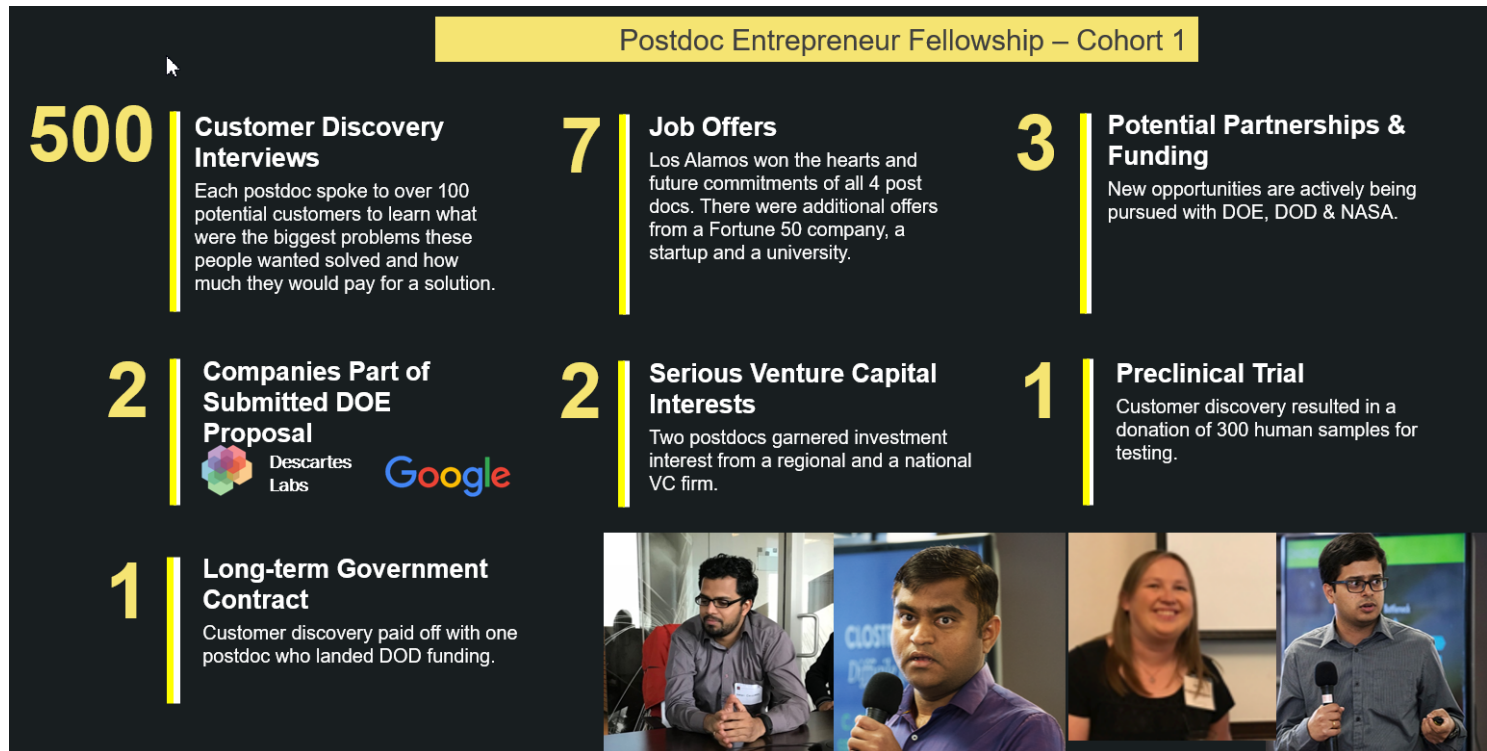
JumpStart offers Los Alamos staff members training and access to national networks to support proposal writing and competitive intelligence that support a commercialization plan. Newly-funded by DOE in FY19

New Mexico Small Business Assistance is a proven and popular tax credit program with the State of New Mexico and Sandia National Laboratories *"to bring the technology and expertise of the national laboratories to small business in New Mexico to promote economic development."*

NMSBA 2016
Los Alamos
Project

Postdocs: Identifying Market Opportunity

Postdoc education and experience as an Entrepreneur



We are exploring new initiatives to drive innovation deployment and regional development

Laboratory Embedded Entrepreneur Technology Accelerator (LEEP)

- Mechanism envisioned to bring high tech to New Mexico
- Accelerators are focus of new networks (e.g., Berkeley, Argonne, ORNL)
- LANL identifies external entrepreneurs to come to Los Alamos and startup new companies based on LANL technology



Goals:



Attract top scientific innovators to New Mexico to start businesses that **focus on breakthrough national security technologies**.



Support them with **access to scientific leaders, partner networks, and funding** to ensure success.



Leverage national networks with UC, TAMU, Battelle and strategic partners in industry and venture capital.



Build on proven models from other DOE National Labs to enhance NNSA missions.



Build economic prosperity locally and nationally.

**Strengthening
National Security
through
entrepreneurial
outreach.**

Proposed technology areas align with New Mexico State industry clusters



Data Analytics

includes machine learning, large scale data fusion, scientific high performance computing.



Advanced Materials and Manufacturing

includes novel materials synthesis, nanotechnology, and additive manufacturing technologies.



Biotechnology and health science

includes genomic and microbiome/metabolome science and technology, advanced diagnostics.

Thank-you!